

Work In Progress – Developing an Individualized Life-Long Learning Plan for Junior Electrical and Computer Engineering Majors

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Abstract - The Accreditation Board for Engineering and Technology (ABET), now ABET Inc., adopted Engineering Criteria 2000 (EC2000) in 1997. At the time this was considered a revolutionary approach to accreditation criteria, because of its focus on what is learned in the classroom rather than what is taught. In the spring of 2003 the faculty of the Electrical Engineering and Computer Engineering department at Binghamton University approved a new course - EECE 382 - Electrical and Computer Engineering Seminar II. The intent was to consolidate topics that were being taught across several courses within one focused seminar to better ensure that Criteria 3 of General Criteria for Basic Level Programs - Program Outcomes and Objectives - was consistently addressed. EECE 382 was to provide an overview of the professional aspects of the fields of Electrical Engineering and Computer Engineering. This paper reports on how one of the objectives of Criteria 3: ‘a recognition of the need for and an ability to engage in life-long learning’ is addressed in EECE 382.

Index Terms – ABET, Engineering Criteria 2000, Life-Long Learning, Engineering Careers, Effective Communication

INTRODUCTION

The Accreditation Board for Engineering and Technology (ABET), now ABET Inc., adopted Engineering Criteria 2000 (EC2000) in 1997. EC2000 continues to be the basis for engineering accreditation today [1]. At the time this was considered a revolutionary approach to accreditation criteria, because of its focus on what is learned in the classroom rather than what is taught.

In the spring of 2003 the faculty of the Electrical Engineering and Computer Engineering (EECE) department of the Thomas J. Watson School of Engineering and Applied Science at Binghamton University State University of New York approved a new junior level course - EECE 382 - Electrical and Computer Engineering Seminar II, as part of a larger effort of effectively meeting outcomes a – k, listed under Criterion 3 of EC2000 [2]. The intent was to consolidate topics that were being taught across several courses within one focused seminar to better ensure that the new accreditation criteria, specifically, Criteria 3 of General

Criteria for Basic Level Programs - Program Outcomes and Objectives - were consistently addressed. Similar courses were starting to be offered at other universities to better meet the new ABET criteria [3]. EECE 382 was to provide an overview of the professional aspects of the fields of electrical and computer engineering. Topics to be covered were to include career paths in EECE, engineering ethics, resume’ writing and job search techniques, preparing for graduate school, the professional engineer license, verbal and written communication, life-long learning, and other professional topics within EECE. An instructor was hired from local industry (Lockheed Martin Systems Integration in Owego, New York) to develop the curriculum and teach the course.

Early on it was decided that the focus of the course should be on the individual student and how he or she could relate in a very personal way to the course topics. Consequently, each student was asked to develop an *Individualized Life-Long Learning Plan*. Students were also asked to write a short paper and prepare a presentation to share their unique career plans with the class. While ‘typical’ engineering career paths were mostly expected, students were encouraged to ‘think outside the box’ on how they might use their engineering degree in non-traditional ways to pursue a personally rewarding career.

This ‘work-in-progress’ presents the course requirements for the *Individualized Life-Long Learning Plan*. The student response to this assignment is discussed. And some of the ‘non-typical’ career goals of our students are shared. A proposal for follow-up on the actual career paths our students have chosen is presented.

THE MOTIVATION

Parkinson [4] talks about students taking responsibility for their learning and having a plan for effectively managing their educational goals. Beyond the management of educational goals lies the management of career goals. Needy [5] discusses how organizations develop a vision, goals, and objectives and the strategies required to achieve success meeting these items. Her students take this out of the abstract and are asked to develop a personal mission statement with both life and career goals. They are challenged to think about how they will maintain their technical skills in support of their career goals. The

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Individualized Life-Long Learning Plan described herein takes this career exercise further with the addition of the plan for achieving their career goals.

A significant enabler of successful career goal management is an attitude of life-long learning. Students often embark on their careers without a clearly articulated set of goals or only have a vague plan on how to achieve them. They assume that significant learning is required to be an engineer, but have no appreciation for the depth of learning required or that learning will need to continue throughout their careers.

The original instructor for EECE 382 came late to engineering, having started his career as a high school mathematics teacher. With his late start in engineering he was well conditioned to appreciate the value of life-long learning in engineering. When provided a chance to teach a new seminar course for junior electrical and computer engineering students, he was eager to share his enthusiasm for life-long learning. When he started work on the course curriculum, he was delighted to find that ABET also values life-long learning and had made it a part of Criteria 3.

THE LIFE-LONG LEARNING PLAN

Students are generally interested in the background of their instructors. A seminar course like EECE 382 offers a good opportunity for an instructor to share his or her background with students, since it is relevant to the course material. This also helps students in their own career planning and serves as an introduction to developing a life-long learning plan.

In EECE 382 students are asked to take a few minutes and write down three life goals. No pressure is placed on students to share their goals with the class, but they are given the opportunity. This exercise serves to eventually have students see their engineering careers in the larger context of their lives. The students are told that they will list three career goals as part of an out-of-class assignment, and that they should reflect on the relationship between their life and career goals.

The class continues with the instructor asking the students to consider personal knowledge, such as knowing what motivates them and knowing their strengths and weaknesses, as an important component in setting career goals. This is the beginning of a self-assessment, which will be part of the out-of-class assignment.

Sources of technical information are presented. By this time in their engineering education students are generally well aware of where to find technical information, but they have probably not yet given much thought to how they might use these resources, once they leave school and start work. The importance of research is emphasized, along with how research might be conducted in industry.

Finally, the out-of-class assignment is discussed. Students are told they are to prepare a 2 – 3 page *Individualized Life-Long Learning Plan*. It is to consist of the following elements:

1. A list of three career goals
2. A statement of where they are today

- a. Transcript
 - b. Resume
 - c. Portfolio
3. An assessment of their strengths and weaknesses
 4. Steps they can take to bridge to their career goals
 - a. More formal education (Masters, PhD, other)
 - b. Work experiences
 - c. Certifications (PE, other)
 - d. Informal education (reading, hobbies, other)

The statement of where they are today is a summary of the current state of their engineering education and experience, as it might be documented in a transcript, resume, or portfolio. Students are asked not to simply repeat information that may already be documented in these three items, but rather to summarize the current state of their engineering career development and refer to these items, as appropriate.

Students are told that the *Individualized Life-Long Learning Plan* is not a static document. It is simply a tool to help achieve their career goals. It will likely change over the entire course of their career. Students are encouraged to keep their *Individualized Life-Long Learning Plans* and refer back to them in later years, much as one might look back at old photographs and reminisce about an earlier time in their lives.

Students generally reported enjoying this assignment. The assignments offer the instructor insight into student career plans. Students report many non-traditional career goals: ‘Work in film special effects’, ‘Own my own DJ company’ – This student has achieved this, and others. Recently one of the authors was made aware that one of his former seminar students had a professional website. Out of curiosity about his former student, he visited the site and was interested to see that the student, now a successful engineer, listed three career goals. Whether the goals were the same as the ones the student had submitted, while a student in the seminar is not known. But apparently, this student had found the exercise useful.

The *Individualized Life-Long Learning Plans* are graded on grammar, spelling, and conformance to the assignment requirements: the previously listed 4 elements, and perceived effort that the student put into the assignment. In accordance with the EECE department assessment procedure representative copies of student work are collected and assignment evaluations are recorded with the department ABET assessment tool and matched to expected program outcomes.

CONCLUSION AND FUTURE PLANS

The *Individualized Life-Long Learning Plan* will continue to be a part of EECE 382 - Electrical and Computer Engineering Seminar II. The instructor will continue to seek feedback from students on the usefulness of the assignment. With the recent uncertainty in the economy, more than ever before, students should be encouraged to do thoughtful career planning, consistent with their life goals.

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